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NAVAL POSTGRADUATE SCHOOL
Monterey, California

Understanding Videoteleducation: An Overview

by

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MEDIA SELECTION IN GRADUATE EDUCATION FOR NAVY MEDICAL OFFICERS

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ABSTRACT

This report addresses the use of instructional media in teaching executive management education. While it is clear that using technology to support distance learning can be cost effective, this research shows that benefits may be lost for learners and instructors in highly interactive learning environments. This research proposes four learning outcomes, which are considered to be consistent with graduate education, and examines them in the context of the instructional techniques required to support them. Media selection guidelines were then developed from the analysis. Data were collected from the developers of 32 modules of graduate-level, management education that are used for Navy medical officers. Module outcomes, instructional techniques, and the expected stability of the learning content were analyzed and the media selection guidelines were used to match each module with videoteletraining, digitized video disc, or traditional classroom instruction.

BACKGROUND

Introduction

Congressional legislation mandates that prospective Commanding Officers and Executive Officers of Military Treatment facilities (MTF) must demonstrate managerial competence before they can assume these job roles. To provide the education necessary to demonstrate that competence, the Navy Bureau of Medicine and Surgery (BUMED) in partnership with the Naval Postgraduate School, Systems Management Department, designed an Executive Management Education (EME) program tailored to the needs of Navy health care professionals. The curriculum contains over 460 hours of graduate-level management education ranging from understanding budgeting to managing change.

The current EME program (that is, modules that have been developed and were available for analysis) consists of 38 modules, ranging in length from 4 to 24 hours, which are delivered at the MTFs. This on-site module delivery plan was developed because it is not feasible for health care personnel to leave their jobs to enter a resident program. However, this delivery method may not provide the modules fast enough to the officers who need them. Furthermore, because officers frequently transfer commands, EME program administrators will have difficulty ensuring that modules that an officer or a small cadre of officers need are available at their command.

To solve this problem, EME administrators are examining the feasibility and

appropriateness of using various types of instructional media such as videoteleducation (VTE) systems and digitized video discs (DVD) to deliver EME modules. To provide EME administrators with the data and analysis they need to formulate a workable instructional delivery plan that does not compromise learning, NPS Systems Management researchers are conducting studies that assess the lessons learned from VTE research and applications; that empirically test for differences in learning, interaction, and student satisfaction between EME modules delivered via VTE and traditional face-to-face instruction; and that offer a theoretical model describing two distinct ways that administrators and teachers think about education that influence VTE system design and pedagogy (Suchan & Crawford, 1995). This report broadens the scope of the inquiry; it addresses to what extent and in what situations VTE and DVD can be used to support the EME Program.

Purpose of the Research

The objective of the research is to develop a heuristic--a set of guidelines--that BUMED educators can use to help select instructional media to support course modules in executive education. These guidelines are reflected in a matrix that links specific BUMED EME modules with appropriate instructional media. The matrix is derived from five primary factors, their relationships with each other, and the actions as a result of those factors.

1. Analyze the needs of the learner and the organization to determine the appropriate instructional content.

2. Match instructional content with learning outcomes, that is, the performance expected as a result of the learning experience.

3. Select instructional techniques that support specific learning outcomes. Instructional techniques vary with respect to levels of interactivity.

4. Select instructional media that will support the levels of interactivity represented by the selected instructional techniques.

5. Modify the media selection decision based on the expected stability of the instructional content and cost considerations.

This report examines each of these factors in detail and shows the interrelated influences that make instructional media choice a complex strategic activity. This complexity is partly caused by differences in control of these factors: learning outcomes may be determined by administrators, instructors, learners, or combinations of these groups; instructional techniques are generally determined by the instructor; and media technology availability and use is often determined by administrators and technology experts. These differences in control make it challenging to align learning needs, learning outcomes, and instructional techniques with instructional media choice.

The integration of these factors results in the matrix for instructional media selection. The matrix, which relies heavily on widely accepted concepts of adult learning and media choice based on media richness, applies as well to other executive education programs.

Before discussing the media selction factors, we provide a brief overview of instructional media choice as a strategic activity. This view that instructional media should be chosen as a result of carefully assessing a number of important variables is the central premise of this report.

Media Choice as a Strategic Activity

Media have unique and defining characteristics. These characteristics, which will be discussed in detail in a later section, determine the type of communication the media can support. In many communication situations, managers and leaders must strategically choose the right media or combination of media to achieve a desired outcome (Daft, R.L., Lengel, R.H., & Trevino, L. K., 1987). Inappropriate media choice can sabatoge a manager's best efforts to achieve that outcome. In fact, strategic media choice is an important ingredient of leadership. Savvy leaders constantly make shrewd media choice decisions to achieve specific outcomes such as extending their presence through the organization or changing organizational thinking and behavioral patterns by using a variety of media to communicate new vision, values, and strategic goals (Trevino, L.K., Daft, R.L., & Lengel, R.H., 1990).

Until recently, training and executive development administrators and instructors have not been faced with significant, large scale instructional media choice decisions. Instructors taught face-to-face in classrooms, and administrators merely needed to ensure that there was the right mix of students, classrooms, audio-visual equipment, and instructors.

That has changed. Advances in instructional technologies have created for both administrators and instructors new, complicated, and in some cases expensive media choice decisions. Determining whether BUMED executive management education modules can be offered via new technologies, and, if they can, deciding which modules lend themselves to these media and determining the right mix of media has become an important strategic media choice decision.

Instructional media must be able to support a variety of instructional techniques such as lecture, question and answer, discussion, dialogue, simulations, and role plays. Some of these approaches enable learners to take individual and collective responsibility for their own and others' learning. Media that enable learners to help direct the content of their own learning can improve the quality of learning and also the satisfaction of learners (Sherry, 1996).

Because these new media are costly and provide a radically different medium for learning, the decision stakes are high. Inappropriate media choice decisions can waste millions of dollars in underutilized "high-tech" equipment, undermine learning, and sour learners about the value of the learning.

FACTORS INFLUENCING MEDIA SELECTION

This section addresses five factors that are proposed as the primary elements to consider in media selection.

Organizational and Adult Learning Needs

Organizational needs will, of course, always be the starting point for any new program to train or educate individuals in the organization. In the case of executive education for Naval medical personnel, the impetus for the new program began with the Congressional legislation mentioned at the start of this report. Additionally, fundamental structural changes in the military health care delivery system have challenged providers to meet their stakeholders' needs. These changes require new knowledge, strategies, and skills to balance effective utilization of health care assets with high-quality care. Even in the early 1980s, Neufeld and Barrows (1984) argued that,

> As a result of the knowledge explosion and technological revolution in the last half of this century, the rate of obsolescence of human beings has been increasing exponentially. In few areas of life has this obsolescence been more pronounced than in the medical profession. (Neufeld and Barrows, 1984, p. 207)

Without doubt, the rate of clinical and administrative knowledge obsolescence has increased. Consequently, lifelong clinical and managerial learning through continuing education is a critical aspect of the careers of all medical professionals. Indeed, concepts like "learning organizations," "continuous improvement," "lifelong learning," and "knowledge creating organizations" have been used to characterize an essential feature that all organizations must have if they are to remain competitive in the next 20 years. Senge argues that "as the world becomes more interconnected and business becomes more complex and dynamic, work must become more 'learningful.'" (Senge, 1090, p.4) Indeed, BUMED members have experienced the organizational jolt that interconnectedness can cause as a result of the movement to TRICARE and the Lead Agency concept.

Continuous learning implies rapid change in knowledge, strategies, and abilities. Consequently, the structure and content of executive medical education must be flexible enough to meet officers' current and future career development needs.

As a result of the Congressional legislation and rapid changes in the medical field, BUMED created organizational strategies to respond to these changes. One strategy was a needs analysis to identify the specific instructional content required for the EME program and the learning needs and expectations of the intended audience. In the case of the EME program, the audience consists of highly sophisticated learners. The physicians, nurses, administrators, and and other health professions represented have high expectations for the relevance of learning to their jobs, how learning should occur, and their roles in the process.

Research on adult learning demonstrates that adults generally learn more deeply and permanently with instructional approaches that give them the opportunity to use their own initiative as compared to traditional teacher-oriented classroom approaches (Savery, J.R. & Duffy, T.M., 1995). These differences in learning result because the adult learner is self-

directing and accustomed to taking responsibility for all aspects of his/her life. Medical community professionals possess these characteristics; generally they have high growth needs, eagerly take responsibility for their learning, and desire autonomy. Knowles (1984) points out that this desire for self-direction presents an interesting problem for instructors:

> For even though adults may be totally self-directing in every other aspect of their lives--as workers, spouses, parents, citizens, leisure-time users--the minute they walk into a situation labeled 'education,' 'training,' or any of their synonyms, they hark back to their conditioning in school, assume a role of dependency, and demand to be taught. (Knowles, 1984, p. 9).

The educator who uses for all learning situations a traditional, lecture-based, teacher-oriented classroom approach in which the adult learner has no control, may create a conflict because of learners' needs for control. If the educator does not resolve this conflict, the adult's energy may be diverted from learning.

This adult learning framework also accounts for the greater quantity and quality of experience that adults bring to the learning situation compared to younger learners such as undergraduate students. This job-related experience and know-how can only be shared if instructors construct environments that create opportunities for learners to interact easily with each other. Knowles (1984) argues that for many kinds of learning, adult students, not instructors, are the richest learning resources for one another. In fact, both Senge (1990) and Nonaka and Takeuchi (1995) claim that significant organizational learning occurs only when individuals have the opportunity to place their individual insights, experiences, and best practices within the larger pool of group or collective experience and test the organizational applicability of those insights and practices. Through instructor-facilitated discussion, dialogue, and even role plays, the individual and group not only can explore complex issues from multiple perspectives and gain insights unavailable from individual self-reflection and analysis but also forge new, shared collective understanding that can reshape organizational

thought and behavior.

Capitalizing on the learning experiences of executives through discussion, dialogue, and role plays requires an instructional environment that enables significant verbal and non-verbal interactivity and allows for rich feedback. Furthermore, these student-centered modes of learning require instructors to function as process facilitators. Consequently, if a new instructional technology is used to reach these executives, that technology must be capable of supporting not only these interactive, communication rich modes of learning but also the facilitation role (and the communication requirements that define that role) instructors must play.

To summarize, the research in adult learning shows that adults, particularly professionals, thrive in communication rich, highly interactive learning environments fundamentally different from the more structured, instructor-centered environment that students with fewer life and work-related experiences learn in. The research shows that adults learn most effectively in environments in which they can exercise initiative and control; experience interactive, collective learning through shared experiences with and feedback from their peers; and respond to learning materials that are contextualized for their professions. Indeed, adults, particularly those in management development programs, enter a learning situation motivated to perform more skillfully a task, to solve more effectively a problem, to make a better quality decision, or to learn to think differently about organizational situations. In short, they want to take immediate action as a result of what they have learned (Edwards, 1992). Consequently, learning experiences must be thoroughly grounded in the context of specific professions, which require constantly updated contextualized learning materials. Furthermore, learners must be provided the opportunity to test and better understand their insights from their experiences through discussion and other more learner-centered teaching techniques.

Although we have made a strong case for the creation of instructional environments that enable professionals to be responsible for and direct their learning, two fundamental questions arise: to what extent do adults need to be involved in their learning and does this degree of involvement apply to all learning situations? In the next section we discuss the second and third media selection factors. This explication shows that distinct learning outcomes exist (Gagne and Briggs, 1979) and to achieve each outcome, instructors must use different instructional techniques and strategies and the right combination of instructional media to support those techniques.

Learning Outcomes and Instructional Techniques

Educators and learners have goals, often called learning outcomes, that are achieved through various communication methods commonly called instructional techniques and strategies or pedagogies. Different instructional strategies and techniques strategically chosen and combined create unique learning environments where students may achieve the desired learning outcomes. Consequently, executive education should be conducted in different instructional environments depending on the requirements of the learning outcome desired. Four, distinct learning outcomes and the instructional techniques that define their pedagogical environments are described.[1]

Know and supply information. This category includes knowledge of facts, principles, concepts, procedures, and rules. Examples from this category are knowledge of contracting regulations, basic principles of accounting, rules and regulations of civilian employment, and the Program Planning and Budgeting System. This knowledge can serve as a building block for more advanced outcomes. Also, this type of knowledge can have a pragmatic function:

[1] We have adapted Gagne and Briggs' (1979) learning outcomes to a hypothetical framework that we believe to be consistent with the outcomes of graduate education.

mid-level executives can supply executives or decision makers with the knowledge to understand a concept, procedure, or rule before taking appropriate action. For example, an MTF's director of administration could inform the CO about the financial guarantees that are part of contracts let out to civilian health-care providers.

When learning basic concepts in an unfamiliar discipline, students are dependent on the teacher's knowledge and ability to communicate clearly that information. Generally, students learn highly structured, self-contained information that they need to memorize, or to know where the information is located and how they can quickly access it. Consequently, knowledge of these basic concepts and structured procedures can be "transferred" from instructor to student. This knowledge transfer can be accomplished by lecture, question and answer, and limited discussion. These instructional techniques require minimal interaction, consisting primarily of periodic feedback to individuals in an question/answer format to ensure correct comprehension of concepts.

Tapping learner experience is not required to attain this learning outcome; however, this may create conflict in highly self-directed professionals. Consequently, it is incumbent upon the educator to remind their self-directed adult learners that there are some situations that require lecture-oriented, instructor-centered learning. Students' engagement with the material is internal; learners need to enter such situations in a searching, probing frame of mind (an internal self-directedness) that will enable them to connect new concepts with prior knowledge to create a richer pattern of associations (Edwards, 1992).

Apply information within structured situations. This outcome requires the learner not only to "know" but also to "do." The student learns what knowledge, principles, concepts, rules, and procedures to apply to structured problem-solving and decision making situations. For example, learners would be able to apply the correct contract regulation to a procurement request; to know how to perform the Total Quality Leadership plan, do, check, act process; or to select the appropriate accounting principle for a financial management decision. Although

there may some degree of uncertainty in these situations, this learning outcome deals primarily with correct and incorrect processes, problem solutions, and decisions. In other words, there is great likelihood that knowledgeable managers would implement the same (or similar) process, solution, or decision. Since this category involves the application of knowledge to a wide range of work-related situations, a moderate level of intructor-learner interactivity is required. For example, instructors must discuss with students a variety of examples and non-examples of situations where the knowledge can be applied. These examples must be current and grounded in the learners' professional context so that they are meaningful to them. Students then can be asked to extend the knowledge and procedure applications by providing additional examples and by describing, based on their professional experiences and observations, the consequences or errors and the reasons why errors are made.

Discussion of how the knowledge, rules, or procedures can be applied to the example situations is instructor directed. Instructors demonstrate these applications and then ask students to apply them to given situations; instructors then give feedback through open-ended questions (coaching) or direct statements (evaluative feedback) to correct student errors. Consequently, instructors trying to develop this student learning outcome must not only be able to lecture well but also must be skilled at giving and eliciting feedback. These instructional techniques require not only subject-matter expertise but also the ability to ask pointed questions, "read" students to determine who is having difficulty learning, and know when it is time to move on to a new application.

Exercise judgment in the face of uncertainty. This learning outcome develops in executives the ability to exercise judgment when faced with complex, messy, and sometimes career-threatening problems of strategy, change management, program management, ethics, and leadership. This outcome defines judgment broadly to include problem analysis, assessment of internal and external stakeholder needs, determination of system-wide implications of implementing a problem solution, and a variety of other activities that require executives to analyze and synthesize both "hard" and "soft" information. Unlike the previous

category, this outcome specifies performance in the absence of firm rules and guidelines for applying learned knowledge and skills.

This outcome defines much of what senior executives do: "Judgment despite uncertainty is essentially the art of management." (Harvard Business School, 1994) Executives must be constantly adding information to their decision-making templates or schema--a highly personalized "bank" of interconnected, organizational knowledge used to make difficult decisions--so as to make them more robust. Furthermore, they must be flexible enough to use a variety of "lenses," depending on the context, to "see" problems and situations from the multiple perspectives of their stakeholders. When a number of management tools are available, they must know which one has a high probability of producing the desired outcome. To do this, they must reconcile disparate evidence and learn to make tradeoffs, to prioritize, to decide what data are most important to the decision.

This outcome requires the executive to understand and use a systems perspective of organizations. The executive has a high-level view of the organization with a clear understanding of its many components and the ways in which they connect and interact. The effective executive understands that changing one part of the organization will have ripple-effects throughout the organization. Thus, executives must consider a wide variety of variables before making a decision. Furthermore, though an executive may understand the probable effects of a decision, he or she will be unable to predict the specific outcome that will result from that decision. Examples of these type of problems include ethics-based decision making, determining when it is risky versus wise to use bottom-line writing, manipulating reward systems versus changing structure to enhance motivation, or using one strategy versus another to manage large-scale change.

The instructional techniques required within this learning domain are clearly learner-centered. Instructors would be wise not to lecture executives on how to make an ethical decision. Although ethical frameworks can be taught as a basic concept within the "Know and

Supply Information" category, ultimately executives make ethics-based decisions under very equivocal circumstances that require them to draw on their deep understanding of organizations based on both education and experience. Instructors must tap these executive wellsprings of experience so that executives can collectively develop their understanding of the myriad situational factors that influence an ethical decision. To do so, highly interactive, and feedback intensive instructional strategies are required. For example, the instructor can use the Socratic method to help executives clarify and refine ideas, role plays that require executives to attend to complex interpersonal dynamics, open-ended questions that enable executives to share and through the articulation of their experiences better understand them, and case studies that enable executives to formulate their own and understand others' strategies for dealing with a complex organizational situation.

Within this learning environment, instructors function as coaches and facilitators; their role is to surface executive experience through appropriate prompts (questions, cases, role plays), orchestrate the interactions and feedback so that executives will see trends and patterns, and create a climate of trust so that executives will not hesitate to share failures as well as successes.

The value of, and expectation for, bringing the executive's experience to the classroom was illustrated in a week-long Navy Medical Department Executive seminar that previewed segments of the EME program. Medical executives provided feedback about the seminar and the EME program in highly interactive focus groups conducted at the end of the week. Group members said that a primary advantage of the program is the opportunity to bring together groups of colleagues from different medical areas who rarely have the opportunity to share their insights and thus learn from each other. These BUMED executives saw this type of individual and collective learning through discussion, debate, and feedback as necessary to prepare BUMED officers for executive-level positions.

Understand and change habits of mind: Paradigm breaking. This last learning outcome attempts to make executives self-conscious about the strategies they customarily use to assess complex problems and to be aware of the assumptions that are at the foundation of these strategies. Sometimes called double loop (Argyris & Schon, 1978) or generative learning (Schon, 1983), the results of this outcome may not immediately be a better repertoire of strategies, but executives who are more aware of the way they typically attack problems, the sources--professional, educational, and personal--of the problem-solving strategies they customarily use, and the strengths and limitations of their approaches. This awareness or heightened self-consciousness may eventually lead to new patterns of thinking that can result in breakthrough interpretations of organizational situations and novel approaches to organizational problem diagnosis.

For example, many executives, particularly those from a hard-sciences background, see communication as the "transfer" of meaning and believe that language "contains" meaning. An executive who sees communication as information transfer will devise communication strategies that both reflect and reinforce that view. Consequently, if the task is to communicate a new mission, vision, and values throughout the organization, he or she may use a wide array of written channels--written documents, postings, e-mail messages, electronic tack boards--to transfer meaning to organizational members. That strategy, driven by the information transfer view of communication, may fail. And because the executive is locked into this information-transfer model of communication, he or she may attribute the failure to others or to poor implementation of the strategy rather than flawed assumptions about communication. In short, the executive is caught in a dysfunctional communication decision making loop, and does not realize it.

To break that loop, a shift of mind or a different mental model about communication is necessary. That shift of mind begins with the executive's recognition of the model of communication being used, an understanding of the limitations of that model, and an appreciation for the way that model shapes one's thinking and action about communication

issues. Only after this realization has taken place, can the executive entertain different habits of mind about communication--for example, meaning exists in the audience, communication is generation of shared understanding, communication is process requiring redundancy to clarify new managerial approaches, miscommunication is the norm--and develop strategies based on this different understanding.

This discussion of potentially dysfunctional habits of thinking about communication issues can be extended to leadership, motivation, change, decision making, reward and incentive systems, and a number of other complex managerial situations.

Generating this learning outcome is difficult. In fact, only the executives themselves can create it. Through prompts such as cases, scenarios, simulations, and role plays, instructors create conditions that enable executives "to put on display" their thinking processes, their habits of mind. While these processes are occurring, the instructor must slow down the executives's thinking processes through pointed questions and the inputs of other executives (collective feedback) so that the learner can become aware of the characteristics of his or her mental model, the inherent assumptions behind that model, the blind spots the model creates, and the ways in which the mental model steers problem interpretation and strategic action.

Creating alternative habits of mind and the strategic thinking and action that result from these new habits is the collective responsibility of the executives. Because of their organizational knowledge, executives should be more insightful than the instructor in generating innovative, "outside-the box" approaches to knotty organizational issues. For this learning outcome to be successful, executives must "suspend" their assumption, literally hold them at arm's length in front of the group. Executives must regard each other as colleagues in learning and, clearly, the instructor must be able to create a high level of trust.

As in the previous category, the instructor functions as a learning process facilitator; however, to help the group engage in dialogue that may result in novel interpretation, a

heightened facilitation, which is a kind of artistry, is required. This requires a heightened sensitivity to individual and group non-verbal signals that enables the group to discover new interpretations rather than to slip in the mode of stating and defending positions. Unlike the previous category in which the learning process involves adding knowledge and skills to the executive's repertoire, this category requires learners to fundamentally change the way they think about organizations. Consequently, there may well be resistance to these changes. As Kantor (1992) has noted, change to new behaviors can be interpreted in a framework that suggests that previous behaviors were wrong, which can serve as a powerful deterrent to change. The instructor/facilitator in this situation must be skilled at managing these perceptions.

Media Characteristics

The previous section described four distinct categories of learning outcomes and the instructional techniques and strategies needed to reach those outcomes. This section uses media richness theory to analyze the different capabilities of media that support various forms of communication needed to deploy instructional strategies and techniques so as to attain various learning outcomes.

Media choice researchers have demonstrated the need to match communication task requirements with media that have capabilities to meet those requirements, These media capabilities can be classified on a continuum from "lean" to "rich." Relatively lean media have sufficient information carrying capacity to fulfill structured, routine communication task requirements such as information exchange or knowledge transfer. With more unstructured and ambiguous tasks, such as strategic planning in a dynamic environment, there is a greater need for rich media to enable people to generate multiple interpretations of available information, explore different solution scenarios, and come to sufficient agreement about the meaning of the problem, the interpretation of the data, and the steps to take (Lengel, R.H., & Daft, R.L.,

1988).

In this context, one of the key requirements of educators is to choose the instructional media that have the communication capabilities to support the instructional strategies required to achieve the desired learning outcomes.

Daft, Lengel, and Trevino (1987) graft media on a lean to richness continuum. We have modified their model to include the emerging instructional media such as VTE that are not included in their original model. There are three interrelated factors that determine the relative leanness and richness of media: the capability of the medium to support various levels of verbal and non-verbal interactivity, the type and timeliness of feedback a medium can provide, and the relative degree of perceived interpersonal presence that the media can enable.

Interactivity is a medium's ability for senders and receivers to notice and respond to each others' communication cues. There are verbal and non-verbal components to interaction: language, speech rate, voice pitch and intonation, eye contact, proxemics (use of space), gestures, and body language in general. Different media support to varying degrees one or more of these components, thus enabling different types and amounts of interaction. Feedback is subcategory of interaction. We define feedback as a specific type of interaction that has as its purpose the development of individual, group, or organizational learning. Finally, interpersonal presence is the media's ability to communicate the personal feelings and emotions that accompany many face-to-face communication interactions (Daft, R.L., Lengel, R.H., & Trevino, L. K. 1987).

How well and easily a medium supports a particular component of interactivity influences the extent to which the component is used. For example, if an instructor using a two-way video and audio videoteleducation system finds it too difficult or cumbersome to "cut" from a long shot of the class to a medium close-up of a student asking a question, that technological limitation will steer the instructor into relying on long shots. That reliance will

affect the interactivity between instructor and learner. The instructor will be forced to focus merely on the language of the question and not the student's facial expression, the tilt of the head, and the position of the body. The limited interactivity because of the need to focus merely on language will influence the content and tone of the instructor's response, the possibility of follow-up questions and responses, and even the possibility that the questions could open up a rich discussion among other learners. In essence, limited interactivity could also limit the amount and type of learning enhancing feedback between the instructor and learners.

Rich media both make available and support through ease of use the full range of interactivity components. Provided below are several illustrations of the media richness criteria applied to specific media.

On the media richness continuum, written communication (non-e-mail) is considered a lean medium. This medium provides limited interactivity. There are no multiple cues from sender and receiver to clarify or reinforce the meaning of the message. And because of the lack of multiple cues, the sender and the receiver have very limited interpersonal presence. That is, the medium enables limited awareness of the other person and the opportunity to develop an interpersonal relationship between the sender and receiver. Finally, the medium provides delayed feedback, if any at all.

One reason correspondence courses, a form of "distance learning," have high drop out rates and low learner satisfaction is precisely because learners get delayed feedback about the quality of their learning. This delay may make it difficult to connect feedback about how well the task was performed with the receiver's awareness of how he/she performed the task; consequently, the impact of the feedback on learning and learner motivation may be minimal. Furthermore, because the medium is capable of supporting limited instructor/student interactivity due to the lack of multiple cues, the feedback may seem cryptic, incomplete, or lacking in thoroughness to the learner. Finally, the lack of interpersonal presence between

instructor and learner caused by limited interactivity may dampen learner motivation to continue the correspondence program. Finally, adult learners may perceive they have no control over their learning. This perception may also dampen motivation.

Another lean medium is digitized video disc (DVD), which provides the student with computer-based instruction with access to massive amounts of information. Single learners engage with a multimedia system to progress through multiple sequences of learning. These systems enable learners to branch out to additional information for elaboration of a concept and for sequences of remediation or acceleration. The automated feedback provided by DVD is timely but generic. It cannot be designed to parallel the abilities and experiences of all of the students in the program. Thus, it may or may not be sufficient to meet individual learning needs. By definition, interactivity is limited; DVD cannot "read" cues that learners provide. Also, interpersonal presence is lacking.

A one-way compressed video (instructor movement is somewhat balky), two-way audio videoteleconferencing system is a moderately rich medium. Because the instructor cannot see the student, non-verbal cues are missing, thus significantly limiting interactivity. Furthermore, factors such as monitor size and quality; room set-up; the number, type, and quality of microphones; and the variety of camera shots (visual interest) affect the type, amount, and quality of interactivity between instructor and learner. This limited interactivity makes it difficult for the instructor to determine the type and amount of feedback to meet learner needs. As a result, feedback content, though rapid and timely, may be limited to learner questions and clarifying answers that may in turn limit learning to knowledge of information and the correct application of programmed procedures. Finally, interpersonal presence is lacking because students are merely voices from a distant location. As a result, trust, openness, and instructor-learner cohesion may be very difficult to develop.

Full-motion, two-way video and two-way audio systems that have multiple, strategically placed cameras with sophisticated camera "cutting" features that enable learners

and instructors to see medium closeups of each other almost immediately after they start speaking is considered a moderately rich medium. Feedback is timely, though voice and movement may be slightly out-of phase. Two-way video enables multiple cues thus enabling increased interactivity. Also, careful shot selection can make clear body language and function to some degree as a substitute for proxemics (the manipulation of physical distance between instructor and learner to create different interaction effects).

Two-way video and audio systems are classified as only moderately rich for the following reasons. Even with careful shot selection, interactivity is limited because many non-verbal signals may be washed out or impossible to see. This varies with the sophistication of the technology available. Furthermore, when the camera zooms to a close-up of a learner speaking, the instructor is unable to see the rest of the group and simultaneously attend to their non-verbals (e.g., who wants to speak next, is confused, is "getting it," is bored, etc.) These limits to interactivity affect the dynamics of open-ended discussions, case analyses, and role plays where attention to subtle cues and split-second feedback timing is necessary for these conversation-rich techniques to be successful. Additionally, interpersonal presence is dampened by the medium: instructors and learners remain two-dimensional visual icons. This may make it difficult to develop the trust necessary to engage in personal idea testing.

These descriptions of various media illustrate the need for administrators and instructors to strategically choose media so that there's a match or an alignment between the communication capabilities of the media--sufficient interactivity, feedback, and interpersonal presence--and instructional techniques and learning outcomes.

Economic Considerations and Content Stability

Once the first four media selection factors have been worked through, there are some practical issues that must be considered. First, what are the cost constraints, and second, how

stable is the instructional content?

Where there is a choice of media that will support learning requirements, it is reasonable to select the lowest-cost alternative. Unfortunately, media decisions are often strongly influenced by cost without regard to learning requirements. For example, many administrators would like to link scores of electronic classrooms and offer all management training and education via videoteleducation and training systems. However, basing these decisions solely on economic factors ignores the differences in learning outcomes and the techniques required to support those outcomes. In the case of management training and education, which may encompass all four learning outcomes and thus multiple instructional techniques, traditional classroom instruction with scores of students at remote locations would not produce effective learning. Running the class by the more lean medium of VTE would force instructors to use instructional techniques that would undermine the instructors' and learners' ability to achieve the more complex learning outcomes discussed earlier. In short, economic considerations would compromise attaining learning outcomes.

The second consideration is the stability of the learning content. As noted earlier, the instructional content in the medical domain will need to be changed often. Much of what medical professionals learn in executive education must be offered through a medium that can be continuously and easily modified so that materials are up-to-date. Indeed, media that enable instructors to quickly and easily change course content is a key criterion of a media choice strategy.

With these final considerations in mind, the next section describes the alignment between specific instructional media and instructional techniques.

MATCHING MEDIA WITH INSTRUCTIONAL TECHNIQUES AND LEARNING OUTCOMES

This discussion focuses on the minimum richness requirements a medium must possess to support the instructional techniques required to attain the various learning outcomes. Media must be capable of supporting the highest level outcome and the most communication rich strategy the instructor is trying to realize.

Furthermore, new media such as DVD and VTE have more traditional media embedded in them (e.g., text and visuals); consequently, these technologies occupy a range on the richness scale. The location on the range depends on how effectively instructors make full use of a technology's capabilities.

Know and Supply Information

This learning outcomes requires minimal instructor/learner interaction, and learners generally require limited feedback. Consequently, relatively lean media can be used to attain this outcome. The lean media requirements enable administrators to focus on cost-saving technologies such as video-taped lectures or multi-point (a number of linked sites) VTE that can reach a large number of students. In fact, emerging, relatively low-cost technologies such as the Internet and the World Wide Web can be piggy-backed onto any one of these previously mentioned media to supply not only information via Web pages but also to provide student feedback via e-mail.

If the content or procedures to be learned remain stable for a long time and the instruction must reach large numbers, then professionally developed, digitized video discs or video-taped lectures (VHS format) with high production values delivered by a dynamic speaker

will enable students to meet this learning outcome.

The drawback of extensively using lean media to train mature adult learners with high growth needs is decreased motivation. As mentioned earlier, seasoned professionals, particularly executive-level, health-care officers, often demand control over their learning and expect instruction that requires them to interact with colleagues. Lean media concentrate the locus of control in the instructor or the technology itself.

Apply Information Within Structured Situations

This outcome requires moderately interactive instructional techniques such as instructor-focused discussion and extended question/answer exchanges. To support these techniques, media located at the mid-level of the richness scale are needed. Consequently, automated instructional media such as computer-based instruction or DVD do not provide the interaction that can be provided by an on-site instructor.

VTE systems have the capability of supporting the communication these instructional techniques require. In fact, one-way video and two-way audio VTE systems, a significantly less costly alternative to two-way video and audio VTE systems, are communication rich enough to support the instructor/learner interaction and feedback. Although the one-way video makes it impossible for instructors to respond to multiple student cues (visual and spatial), the structured nature of this learning outcome may require only verbal interaction between instructor and learner.

This outcome requires highly interactive, feedback-intensive instructional techniques such as discussion, case analysis, and role plays. These techniques require rich communication media. Obviously, face-to-face instruction is the richest medium. However, a cleverly designed full-motion, two-way video and two-way audio VTE system may be able meet the richness criteria. This system would require state-of-the art equipment at the originating and remote sites. For example, Hewlett-Packard has constructed a television studio-quality originating site for their product and salesperson video training programs. To employ highly interactive, feedback-intensive instructional techniques, instructors need to use the equipment to its maximum communication capacity. This use may require technical and graphics support.

Although a robust VTE system may be able to support the instructional strategies this learning outcome requires, creating the interactive, feedback-rich learning environment is considerably more difficult via VTE than in the traditional face-to-face classroom. The medium acts as a filter to the free-flowing interaction that can occur in face-to-face communication. For example, even the most sophisticated satellite broadcast systems have a voice transmission time lag that can make conversation awkward. This time lag significantly affects routines for entering and exiting conversation that instructors and learners unconsciously use. Consequently, the free-flowing, dynamic exchanges that characterize well-run case analyses and role plays are difficult, if not impossible, to duplicate in the VTE environment. Furthermore, different remote location microphone systems--some of which link an open mike with a medium close-up shot of the person speaking--require learners to time the opening and closing of their mikes so that the instructor can hear the conversation and see the person speaking. This requirement dampens spontaneity and can result in a halting, slowed-down discussion.

Even in true-full motion (30 frames per second), two-way video VTE systems, the camera and the monitor do not function like human eyes. This lack of full physical fidelity can

make it difficult to determine who is speaking at remote sites, particularly if the speaker is in the back of a traditionally designed classroom. Also, this lack of fidelity makes it very difficult for instructors to analyze non-verbal cues to determine who is confused, bored, or wishes to speak next.

Although these and other factors dampen interaction and limit feedback, we do not know to what extent these differences affect learning or how much they may be mitigated as a result of instructors' and learners' changing communication behaviors as a result of continuing use of and greater familiarity with VTE systems. Clearly, the limitations these factors create require that instructors make the effort to learn about and use special, VTE-specific interaction and feedback techniques for activities such as case analysis and role plays. We believe these techniques may partially mitigate the dampening effect VTE has on interaction. This mitigation would enable the instructor to use adequately the teaching strategies required to achieve the desired learning outcome.

In short, VTE use causes a tradeoff between the amount of interaction as well as the quality of feedback and cost effective access to learners. Given financial constraints, the tradeoff may be well worth it.

Understand and Change Habits of Mind: Paradigm Busting

This outcome requires instructional techniques that are highly interactive and feedback intensive. Furthermore, instructor interpersonal presence is a key factor to establish the learning climate to achieve this outcome. To function as facilitators, instructors must be perceived as trustworthy and be able to help establish that climate in the learning environment. Consequently, a very rich medium is required. We believe that only the face-to-face medium is capable of meeting this requirement because of its ability to be highly interactive, enable varied types of feedback, and support the interpersonal presence of the instructor and learners.

To create the conditions for this outcome, the instructor as facilitator must artfully create a safe learning environment where executives can leave their job roles and positions "at the door." Furthermore, the facilitator must generate trust so that executives will be less likely revert to defensive routines that protect them from the embarrassment and threat of "exposing" their own thinking and making clear the assumptions and weaknesses behind that thinking.

Clearly, the interpersonal presence of the facilitator and executives is essential to create the trust and non-defensiveness that such forms of interaction and feedback require. Even the most sophisticated VTE systems cannot duplicate the complex interplay of visual, spatial, tactile, and olfactory cues that generate interpersonal presence and enable the facilitator to create a safe learning environment. In the most general sense, VTE does not allow a facilitator to reach out and touch someone. The facilitator remains a two-dimensional, digitized visual icon that exists only on a monitor.

In addition to the difficulty of generating trust, even robust VTE systems are unable to support the amount, type, and quality of interactivity this learning outcome requires. For example, the VTE system at the Naval Hospital in San Diego requires users to click on their mike to speak so that the camera zooms in on the person speaking; this process governs all verbal interaction at the remote site. Although this zoom to a medium-close-up enables the remote instructor to better read the speaker's visual cues, the instructor, however, cannot see the reactions of others to the comment. This complex microphone and camera shot selection system makes it impossible for learners to interact with each other in a spontaneous, free-flowing manner, let alone for remote facilitators to generate dialogue, keep it dynamic, and skillfully intervene when defensive routines begin to occur.

In addition, these systems, as discussed in the previous section, are unable to provide the multiple, fine-grained visual and auditory cues that are a prerequisite for quality debate and discussion. Consequently, only small-group, face-to-face seminars have the requisite amount of communication medium richness to employ the instructional strategies needed to attain this

learning outcome.

LEARNING OUTCOMES OF BUMED MODULES

We surveyed NPS BUMED module instructors to determine learning outcomes of each of their modules (the modules are shown in Appendix A), the instructional techniques used to achieve those outcomes, and the expected stability of the content of their modules (the survey is included as Appendix B). These data were compiled in a matrix that matches these factors with the media rich enough to help achieve the desired learning outcomes. Table 1 shows the data collected from the instructors. Five modules are not represented in the table because the instructors were not available to provide the data. Table 2 shows the match between each module and the media that could be used for delivery. The criteria used for matching the modules to media are discussed below.

Table 1. BUMED Module learning outcomes, learning techniques, and expected rate of change.

TABLE 1

	BUMED Module Learning Outcomes				Learning Techniques							Expected Rate of Change				
Module	Know and Supply In formation	Apply Information	Exercise Judgment	Change Habits of Mind	Lecture	Question/Answer	Discussion	Case Analysis	Group Exercises	Role Plays	Simulations	Other	0-20	21-40	41-60	61-80	>81
1	20		40	40	20	10	20	20	20		10			X			
2	20		40	40	20	10	20	20	20		10			X			
3	25		50	25	25		35	20		20				X			
4	35	25	20	20	40	10	25	25					X				
5	25	10	45	20	25		20	20	15	20				X			
6	40	30	20	10	40	25	35							X			
7	20	20	40	20							100			X			
8	50	30	10	10	50	20	20	10					X				
9	10	20	50	20							100			X			
15	50	30	10	10	50	20	20	10					X				
16	50	30	10	10	50	20	20	10					X				
17	50	30	10	10	50	20	20	10					X				
18	15	15	40	30	20	15	40	10	15								X
22	50	30	10	10	50	20	20	10					X				
24	70	5	5	20	70	20	10						X				
25	80	10	10		80	10		10						X			
26	60	20	20		70	10	10	10					X				
30	40	20	15	25	40	30	10	20						X			
33	50	20	20	10	50	20	20	10							X		
34	30	35	20	15	40	10	25	25							X		
35	35	45	15	50	50	10	30	10						X			
36			75	25	35	25	20		20					X			
37			75	25	40	30	30							X			
40	20	10	50	20	30		20	20	20	10				X			
42	60	20	20		70	10	10	10							X		
45	15		60	25	15	10	15	40	20					X			
46	30	10	40	20	20	10	20	10	40					X			
47	30	10	30	30	40	10	15	20		15				X			
48	15		60	25	15	10	10	30		35				X			
49	20	40	30	10	20	10	10	30	25		5			X			
50	10	10	40	40	20	20	20	20	20						X		
51	60	10	20	10	75	15	10							X			

Table 2. Media Recommendations for BUMED Modules

TABLE 2

VTE CANDIDATES

Module	DVD	Excellent	Satisfactory	High Risk
1				X
2				X
3				X
4	X	X		
5			X	
6		X		
7				X
8	X	X		
9				X
15	X	X		
16	X	X		
17	X	X		
18			X	
22	X	X		
24	X	X		
25		X		
26	X	X		
30		X		
33		X		
34		X		
35		X		
36				X
37				X
40			X	
42				X
45				X
46			X	
47			X	X
48				X
49				X
50				
51		X		

Stability of module content was the primary criterion used to determine which modules might lend themselves to DVD application. As Table 1 indicates, module content stability is divided into five categories that represent the amount of change in content a module would undergo within three years. Module developers determined the percentage of change in module content by checking the appropriate category.

As indicated earlier, DVD technology would be cost effective for module content that could be expected to remain relatively stable for an extended period. The high cost of initial DVD preparation would make modules in which content changes quickly poor candidates for DVD application. Stable content is operationalized here as equal to or less than 20 percent change in module content within a three-year period.

Another criterion used to determine DVD module applicability was the learning outcomes of the module and, indirectly, the pedagogical techniques used to meet those outcomes. DVD provides learners with structured learning heuristics that are anticipated and devised by subject matter experts. Consequently, DVD technology well supports learning outcomes that reflect knowledge acquisition (e.g., knowledge of accounting concepts and contracting regulations), structured processes (e.g., following the correct HAZMAT procedures), and even some complex decision processes where there is sufficient information to use a structured process for making a decision (e.g., constructing a stakeholder map). These outcomes are reflected in the Know and Supply Information and Apply Information to Structured Processes categories.

In addition to the content stability criterion, we also stipulated that at least 50 percent of a module's learning outcomes must reflect these two categories for a module to be a good candidate for DVD application. As Table 2 indicates, eight modules meet these criteria.

VTE Criteria

The amount of interactivity a module requires was the primary criterion used to determine VTE module applicability. This "amount," which varies from module to module, was implicit in the instructional techniques module developers use to achieve specific learning outcomes. Specifically, module instructors who rely on lecture and question/answer techniques require less interaction between themselves and students, and between and among students, than instructors who use discussion, cases, role plays, interactive exercises, and other forms of experiential learning.

In addition, since learning outcomes desired should influence instructional techniques, we examined the data to determine if there was a relationship between a module developer's determination of learning outcomes for a module and the instructional techniques used to achieve those outcomes. Except for modules numbered 36 and 37, there is a very strong relationship in the expected direction. Modules focusing on Know and Supply Information and Apply Information to Structured Processes depend heavily on lecture and question/answer techniques. On the other hand, the learning outcomes of Exercise Judgment and Change Habits of mind are associated with more interactive pedagogy.

The earlier discussion of VTE implies that using the medium for specific learning applications is not a simple yes/no choice. Because interactivity is a continuum, we suggest three categories of the VTE-module "fit." These categories, as shown in Table 2, suggest that some modules are excellent candidates for VTE, others are satisfactory, and yet others are high-risk VTE candidates.

Excellent candidates for VTE are classified as modules that use 50 percent or more lecture and question/answer, and focus 50 percent or more on the Know and Supply Information and Apply Information to Structured processes learning outcomes. These modules

are excellent candidates because they do not require interpersonnaly complex interaction to attain their learning outcomes. Consequently, the dampening effect that VTE systems have on more complex interpersonal interactions is not an issue when the interaction is highly structured and, often, instructor directed.

Modules in this category may also allow for multipoint delivery sites. In fact, a worthwhile research project would be to determine the number of additional sites that could be added to a particular delivery before learner satisfaction and learning drops off. In addition, modules in this category might be offered via a one-way video and two-way audio VTE system. This type of system would significantly reduce the delivery costs. Table 2 shows that 15 modules meet the criteria, including the eight modules that are also recommended for DVD.

Satisfactory candidates for VTE are classified as modules that use 50 percent or more of the highly interactive instructional techniques (everything other than lecture and question/answer), and focus 50 percent or more on the Exercise Judgement and Change Habits of Mind learning outcomes.

Modules that meet these criteria are considered only satisfactory candidates for VTE because--according to the literature reviewed and the analysis presented here--there are potential difficulties in using VTE technology to support the amount of interactivity required for the instructional techniques used for these high-level learning outcomes. Literature reviewed and interviews conducted by the present researchers (Suchan and Crawford, 1995) indicate frustration on the part of some learners and instructors when VTE is used where extensive interpersonal interaction between and among all participants is required. While there is insufficient research to determine the actual impact on learning effectiveness, there is some risk of a decrement in learning and learner satisfaction, particularly among senior managers, if VTE is used for less-structured learning outcomes. We have recently completed data collection on a study that addresses whether there are decreases in learning outcomes and

interactivity between VTE and a face-to-face version of a moderately interactive BUMED module.

A factor that mitigates potential learner frustration and dissatisfaction is availability and perceived access to the education. Learners tend to be more tolerant of the decreased fidelity of a VTE system and system breakdown if they perceive they need the education and would have difficulty obtaining it from traditional face-to-face instruction. Similarly, learner expectations of the educational experience--based on experience with interactive learning in the traditional classroom format--will moderate frustration with technology-based education. Learners experienced in face-to-face interactive education are less likely embrace the technology. These factors underscore the importance of analyzing the student population before technology is implemented.

Table 2 shows that there are five modules in this category. If VTE is used for these modules, a two-way video and two-way audio system is strongly recommended.

High-risk candidates are classified as modules that focus 75 percent or more on highly interactive learning techniques and/or the Exercise Judgment and Change Habits of Mind learning outcomes. The lack of research and experience in using VTE to achieve such complex learning outcomes suggests that a large-scale VTE investment for such learning would not only be a serious waste of resources at this time, but could also undermine the learning that BUMED executives require to be skilled MTF Commanding Officers and Executive Officers. Therefore, our recommendation is to limit technology-based teaching of such outcomes to experimental settings. Otherwise, traditional, face-to-face instruction should be used to ensure learning effectiveness. Table 2 shows that 13 of the BUMED modules are in this category.

CONCLUSIONS AND RECOMMENDATIONS

The underlying theme of this analysis is that decision makers have paid insufficient attention to student needs and expectations and educational effectiveness when the determination is made to implement instructional media such as VTE. While cost savings of technology-based education are understandably attractive, inappropriate technology-education pairings can undermine learning effectiveness, student and instructor satisfaction, and program credibility.

This research demonstrates an approach for systematically selecting instructional media for specific learning applications that places priority on the desired learning outcome and the media required to support the instructional techniques to attain that outcome. While the research community has long discussed the value of designing instructional events to support learning outcomes (beginning with Gagne, 1970), the present researchers observe administrators' instructional media choice decisions tend to be cost or technology driven (i.e., the least costly option is selected or the lure or availability of a new technology strongly influence decision making). The underlying assumption behind most of these decisions is that training or education can be "delivered" or "transferred" to students regardless of their expectations or the pedagogical needs for interactivity.

These issues are further complicated by the fact that much of the research literature deals with training. Certainly, the Navy--the audience for this research--deals extensively in training its people through a vast and effective training infrastructure. Education, particularly graduate and management development education, is significantly different from training with respect to learning outcomes and pedagogy.

While we have encountered numerous institutions using technology-based education, few have had the chance to conduct research related to their efforts. Technology has developed so rapidly that many institutions perceive an urgency to jump in and use it for fear of falling

behind. As we heard from one institution engaged in a Master's degree program via VTE, "We know we should be doing the research, but we just don't have the time!"

This research makes an initial step toward defining and analyzing variables that must be assessed to ensure that the balance between cost and learning effectiveness is achieved when media selection decisions are made. Because this is an initial effort, we recommend the following additional research.

1. Conduct further research into learning outcomes for graduate education and continuing education/management development programs.

2. Examine the expectations of adult learners for technology-based, graduate-level education and determine if perceptions change with exposure to the various media. This type of work is particularly important for the senior medical personnel who represent the target population for this study. These highly sophisticated learners will not tolerate low technological fidelity and decreased opportunities for interaction. As noted earlier, they feel that instructor-facilitated discussions among themselves are catalysts of learning that are as important as the planned curriculum.

3. Conduct empirical tests to determine the effects that various VTE system configurations (one-way versus two-way video and two-way audio), the number of sites, the number of students at each site, and different learning outcomes have on learning effectiveness. Sound measures of effectiveness that go beyond "smile scales" ("Did you like learning by VTE?") should be used. In this manner, decisions can be made to isolate the types of training and education that can appropriately be conducted for many students at multiple sites on low-cost VTE system configurations. Concurrently, those situations in which such cofigurations cause a decrement in learning effectiveness will also be identified.

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APPENDIX A

Module 1: Understanding and Effectively Using Communication Media (4 hours)

Module 2: Communicating Vision and Change in a Complex System (4 hours)

Module 3: Empowering Associates Through Strategic Feedback (4 hours)

Module 4: Bottom Line and High Impact Health Care Communications (8 hours)

Module 5: Listening for Success (4 hours)

Module 6: Decision Meeting Management (4 hours)

Module 7: A Practical Approach to Strategic Planning (20 hours)

Module 8: Health Care Marketplace Dynamics (16 hours)

Module 9: Stakeholder Management and Mapping the Health Care Environment (8 hours)

Module 11: Total Quality Leadership - The Theory (8 hours)

Module 12: Total Quality Leadership - The Context (8 hours)

Module 13: Total Quality Leadership - The Application (8 hours)

Module 15: Tools for Effective Management Under Risk and Uncertainty (8 hours)

Module 16: Analytic Tools to Support Decision Making in Health Care (8 hours)

Module 17: Cost-Output Analysis - A Decision Making Support Tool (8 hours)

Module 18: Effective Information Systems (4 hours)

Module 22: The Evolution of Health Care Market Dynamics (8 hours)

Module 24: Budgeting for Defense Health (4 hours)

Module 25: Military Medical Acquisition Management (4 hours)

Module 26: Ethical Conduct Requirements in Acquisition Management (4 hours)

Module 30: The Accounting Model and Financial Reporting (8 hours)

Module 31: Management Accounting - Application to Health Care (8 hours)

Module 32: Considerations in Health Care - Make or Buy Decisions (8 hours)

Module 33: Regulatory Aspects of Managing Civilian Personnel (8 hours)

Module 34: Materials Management (4 hours)

Module 35: Health Care Facilities Management (4 hours)

Module 36: Productivity Measurement and Incentives (10 hours)

Module 37: Understanding Non-Financial Resource Allocation (4 hours)

Module 38: Defense Acquisition Process and Health Care Implications (8 hours)

Module 40: Transition Management - Executive Considerations in Implementing Strategic Plans (16 hours)

Module 41: Managing Change in a Military Healthcare Setting (12 hours)

Module 42: Managing Change in Healthcare - Creating a Learning Organization (16 hours)

Module 45: Leadership and Motivation (8 hours)

Module 46: Managing Teams in Complex Health Care Environments (8 hours)

Module 47: Working in Teams (8 hours)

Module 48: Conflict Management and Negotiation (4 hours)

Module 49: Empowerment in Navy Health Care (4 hours)

Module 50: Strategic Management (4 hours)

Module 51: Medical Readiness (4 hours)

APPENDIX B

September 5, 1996

From: Alice Crawford and Jim Suchan

To:

Subj: EME Module #

In response to a BUMED committment to evaluate how well various instructional media apply to EME module delivery, we need to collect some information from you about your module(s). Please answer the questions listed below and return this memo to Alice by September 14th.

We are asking you to:

* categorize each of your modules by its learning outcome(s),
* determine the pedagogical techniques you use to achieve those outcomes, and
* estimate your module content's shelf life, in other words, the extent to which you believe your module content will change within the next three years.

This information will help us determine how well suited each module is for traditional classroom education, video teleconferencing, or a new form of computer-based instruction called digitized versatile disc. Please answer the following questions about your modules.

1. Read carefully the description of each of the following learning outcomes. Classify your module by the outcomes that best describe what you are trying to accomplish in that module.

You may choose one or more of the four outcomes when classifying your module. Assign a percentage to each outcome. Your total for all four outcomes should add up to 100 percent.

a. **Know and Supply Information.** The outcome is student understanding of concepts, rules, regulations, principles, and/or procedures. For example, the Director for Administration of an MTF could inform the CO about financial guarantees that are part of contracts let to civilian health-care providers. The success of the learning experience, if a test were given, is measured by how well students remember information.

Percent =

b. **Apply Information Within Structured Situations.** The outcome is to teach executives to apply knowledge to structured problem solving situations. For example, the executive could apply the correct contract regulation to a procurement request. Decisions and solutions to problems may be judged as correct or incorrect since there is only one right answer, correct process, or correct procedure to follow.

Percent =

c. **Exercise Judgment in the Face of Uncertainty.** The outcome is to teach the executive to analyze a multitude of variables to make decisions and solve problems in the absence of firm guidelines or rules. For example, the executive might analyze the organizational issues that impact the decision to change reward systems instead of organizational structure to enhance motivation; there may not be one "right" decision. Measurement of this outcome is subjective because the executive must

learn to determine which decisions and solutions have the highest probability of success.

Percent =

d. **Understand and Change Habits of Mind.** This outcome results in executives becoming more self-conscious of the strategies they customarily use to assess complex situations and more aware of the assumptions that are the foundation of those strategies. An example of this outcome would be executives recognizing they think of communication as information transfer, understanding how this view limits their communication behavior, and uncovering a different set of assumptions (e.g., communication as shared understanding) that would reveal fundamentally different approaches to communication issues. The outcome may not immediately create a better repertoire of strategies, but it will increase awareness of patterns of thinking, the limitations of those patterns, and how they influence behavior.

Percent =

2. Please review the instructional techniques listed below. Assign percentages that reflect the extent to which you use that technique when delivering your module.

	Percent
Lecture	_____
Question/Answer	_____
Discussion	_____
Case Analysis	_____
Group Exercises	_____
Role Plays	_____
simulations	_____
Other (Specify) _____	_____
Total =	100%

3. To what extent do you believe your module content will change in the next three years? Circle the percent range that best applies.

0-20% 41-60% 61-80% 81 > %

Thank you for your help. Please add any comments you may have.

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